**Lecture Notes**

**Week One: The Immune System**

The immune system is our body’s line of defense again antigens that causes viruses, illnesses, and disease. The immune system is made up of different cells, organs, and proteins. The immune system recognizes foreign antigens that causes us to become sick and fights them off.

There are three types of immunity. They are innate, adaptive, and passive. Our innate immunity is what we are born with. The innate immunity system are physical barriers such as our skin, respiratory tract, gastrointestinal tract, the nasopharynx, cilia, nails, eyelashes, and body hair. They also include defense mechanisms such as secretions, saliva, sweat, mucous, bile, gastric acid, and tears.

The innate immune system is activated when the body detects the presence of antigens and their chemical properties, resulting in a general immune response. General immune responses such as inflammation, complement, and non-specific cellular responses. When the inflammation response is triggered, it increases blood flow to the area of infection which actively brings the immune cells to the infection site. The immune response complement marks the pathogens with holes, setting them up for destruction (Khan Academy, n.d.).

The adaptive immunity is also called “active immunity.” Adaptive immunity develops throughout life. This happens when we are exposed to certain diseases. When the body is reintroduced to that disease, the immune system recognizes it and prepares to fight it off. Another form of adaptive immunity is the use of immunizations and vaccines.

Passive immunity is immunity that “borrowed” and not produced on its own. These antibodies are received from and outside source and does not last for long periods of time. Examples of passive immunity would be a newborn baby receiving antibodies from the mother through the placenta, and later through breast milk. Passive immunity could also be received through antibody-containing blood, such as immune globulin (CDC, 2021).

The key to preventing infections and diseases such as Covid-19 is to maintain a healthy immune system all year long. There are many steps that could be taken to naturally boost your immune system, starting with making healthy lifestyle choices, which we will discuss next week. Research has shown that a way to help bolster the immune system is through certain vitamins, herbs, and supplements that we will talk about in week three.

**Week Two: Natural Ways to Boost the Immune System**

Covid-19 has infected over 50 million U.S Citizens, with the numbers rising daily. And though we are being encouraged to get vaccinated against the virus, the numbers are continuing to rise daily, with recent reports showing that even the vaccinated are being infected. Your first line of defense against viruses such as Covid-19 is your immune system. Maintaining a healthy immunity begins with choosing healthy lifestyle choices. There are several things that you could do daily to naturally keep your immune system functioning properly, keeping you as healthy as possible. Many people are seeking to boost their immune systems.

Though there is a vaccine to help lessen the effects of Covid-19, many vaccinated people are still contracting the virus. There are currently no medications that will prevent or cure Covid-10; however, there are many steps that you can take to make your immunity defense is as strong as possible.

A healthy diet that is balanced with plenty of fruits and vegetables will provide the body with the essential nutrients that is needed for a healthy functioning immune system. Physical Activity also promotes a healthy immune system. The diet and exercise combined could aid in maintaining a healthy weight which is also beneficial to immune system. We should try to avoid toxins such as smoking and alcohol. If you do drink alcohol, it is recommended that you only drink it in moderations. The body also needs an adequate amount of sleep for the body to function properly, this includes the immune system. Harvard Health lists trying to minimize our stress to help keep a healthy immune system. “According to the American Psychological Association, stress reduces the number of lymphocytes that the body needs to fight off viruses (UMMS, 2020) Since the beginning of the pandemic, scientist have strongly urged us to practice proper hygiene. This is includes washing our hands frequently, sanitizing your hands and surfaces, wearing a mask in crowds, and maintaining distance. It is now being urged to avoid contact with people if you are feeling sick and to quarantine if you are experiencing symptoms and know that you have been directly exposed to the virus. Harvard Health reported that it is important to keep current with all of the recommended vaccines because “Vaccines prime your immune system to fight off infections before they take hold in your body.” (Harvard Health, 2021) The Covid-19 vaccines and booster shots are encouraged to lower the risk of infection and well as lessen the symptoms if you do contract the virus.

**Week Three: Vitamins, Herbs, and Supplements for the Immune System**

So now that we know from scientists that there is no current medicine that cures Covid-19, and the vaccination does not fully protect us from the virus, vitamins, herbs, and supplements that are used to boost the immune system are becoming even more popular during the pandemic. When the pandemic first hit, it was recommended by many medical professionals to supplement with Vitamins D and C, the mineral Zinc, and Black Elderberry (Sambucus nigra).

Scientists have highly researched Vitamin D in connection with Covid-19 because it is an essential fat-soluble nutrient is important for a functional immune system. Vitamin D enhances the effects of the immune defense against illnesses. This vitamin may also protect us against respiratory tract infections; as well as aid in the stalling of inflammation and expedite healing of the respiratory system. According Healthline, “In a 2019 review of randomized control studies in 11,321 people, [supplementing with vitamin D](https://www.healthline.com/nutrition/how-to-increase-vitamin-d) significantly decreased the risk of respiratory infections in people deficient in this vitamin and lowered infection risk in those with adequate vitamin D levels.” (Kubala, 2021) It is recommended that it is sufficient for most people to supplement anywhere from 1,000 to 4,000 IU of Vitamin D per day.

Zinc is a mineral that often discussed when boosting the immune system. Not only is it vital for immune cell development and inflammatory response but is also protects the tissue barriers in the body that prevent foreign pathogens from entering. Those with a Zinc deficiency have a greater risk of infection and disease and studies have found that 16% of all deep respiratory infections worldwide have been found to be due to zinc deficiency. Taking a Zinc supplement can reduce the duration of infection (Kubala, 2021).

Vitamin C is found in many fruits and vegetables. It is also found in many fortified products, but it is also the most popular supplement used to promote immune health and protects against infections. This is because it is a power antioxidant. Healthline says that “It’s also necessary for cellular death, which helps keep your immune system healthy by clearing out old cells and replacing them with new ones.” Taking a daily supplement of Vitamin C reduce the duration and improves symptoms of respiratory infections (Kubala, 2021).

Black Elderberry has been used for a long time for immune support, but recently has become more popular. It has potent antiviral and antibacterial potential to fight off the pathogens that causes respiratory tract infections. Not only does it enhance the immune response, but it also shortens the duration and reduces the symptoms of a vital infections. In the same article posted by Healthline “A review of 4 randomized control studies in 180 people found that elderberry supplements significantly reduced [upper respiratory symptoms](https://www.healthline.com/health/acute-upper-respiratory-infection) caused by viral infections.” (Kubala, 2021). Though these studies have found the benefits of elderberry for the reduction of symptoms of infection, there are conflicting studies that suggest the elderberries can cause an excess production of cytokines. This could potentially damage our healthy immune cells, so some recommended that elderberry only be used in the early stages of the Covid-19 infection.

Many people are turning to these supplements to protect themselves from contracting the virus, but also to lessen the symptoms. These combinations of vitamins, herbs, and supplements are common in many products that claim they are immune support supplements. Airborne Elderberry tablets and Zarbees Children’s Immune Support all list elderberry zinc, vitamin C, and vitamin D in their nutritional facts. Though studies have shown that these supplements can improve our immune system, it is also a good idea to discuss these supplements as well as the dosage with your medical professional first.

References:

CDC. (2021, September 24). *Types of immunity to a disease*. Centers for Disease Control and Prevention. Retrieved January 4, 2022, from https://www.cdc.gov/vaccines/vac-gen/immunity-types.htm

Harvard Health. (2021, February 15). *How to boost your immune system*. Harvard Health. Retrieved January 4, 2022, from https://www.health.harvard.edu/staying-healthy/how-to-boost-your-immune-system

Khan Academy. (n.d.). *Innate immunity (article) | immune system*. Khan Academy. Retrieved January 4, 2022, from https://www.khanacademy.org/test-prep/mcat/organ-systems/the-immune-system/a/innate-immunity

Kubala, J. (2021, April 19). *Can supplements fight coronavirus (COVID-19)? 15 immune boosters*. Healthline. Retrieved January 8, 2022, from https://www.healthline.com/nutrition/immune-boosting-supplements

UMMS. (2020, December 1). *How does stress affect the immune system?* UMMS Health. Retrieved January 4, 2022, from https://health.umms.org/2020/11/10/stress-immune-system/

Yousfi, N., Bragazzi, N. L., Briki, W., Zmijewski, P., & Chamari, K. (2020, September). *The COVID-19 pandemic: How to maintain a healthy immune system during the lockdown - A multidisciplinary approach with special focus on athletes*. Biology of sport. Retrieved January 4, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7433333/